

1 Response to Final Office Action dated December 2, 2004

2 Amendments to Claims

3 Claims 37, 38, 54, and 56-57 have been amended as provided above.

4 Specifically:

5 Claims 37 and 38 have been amended such that the term "sheet piling" now
6 reads as "plural sheet piles". The Applicants believe such amended terminology to
7 be clarifying in nature and consistent with that used by one of ordinary skill in the
8 relevant art, both at the present time and at the time of invention.

9 Support for such clarifying amendments to claims 37 and 38 is found at least
10 in Figs. 14 and 15A-15F of the Drawings, and page 19, line 24 to page 22, line 22 of
11 the text of the Specification, as respectively originally filed.

12 Claim 54 has been amended to correct an antecedent basis problem (for "wall
13 element"), and to reword the claim to recast a negative limitation as a positive
14 limitation. This amendment is consistent with wording used in original claims 22 and
15 55 (now cancelled). Claim 55 has been cancelled since it is redundant in light of the
16 amendments to claim 54; claim 56 has been amended to depend from claim 54; and
17 claim 57 has been amended to be consistent with amended claim 54.

18 No new matter has been introduced by way of the amendments to the claims.
19

20 Rejection of Claims under 35 U.S.C. § 102

21 Claims 37-38 and 40-41 are rejected under 35 USC § 102(b) as being
22 anticipated by JP-03013691-A to Ino et al. ("Ino '691").

23 The Applicants respectfully disagree that claims 37-38 and 40-41, as
24 respectively amended, are anticipated by Ino '691.

25 As a starting point, the PTO and the Federal Circuit provide that §102
anticipation requires each and every element of the claimed invention to be
disclosed in a single prior art reference. (*In re Spada*, 911 F.2d 705, 15 USPQ2d

1 1655 (Fed. Cir. 1990).) The corollary of this rule is that the absence from a cited
2 §102 reference of any claimed element negates the anticipation. (*Kloster*
3 *Speedsteel AB, et al v. Crucible, Inc., et al*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir.
4 1986).) Furthermore, “[a]nticipation requires that all of the elements and limitations
5 of the claims are found within a single prior art reference.” (*Scripps Clinic and*
6 *Research Found. v Genetech. Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010
7 (Fed. Cir. 1991 (emphasis added).) Moreover, the PTO and the Federal Circuit
8 provide that §102 anticipation requires that there must be no difference between the
9 claimed invention and the reference disclosure. (*Scripps Clinic and Research*
10 *Found. v. Genetech, Inc.*, id. (emphasis added).)

11 Accordingly, if the Applicants can demonstrate that any one element or
12 limitation in claims 37-38 and 40-41 is not disclosed by Ino ‘691, then the respective
13 claim(s) must be allowed.

14 In the following arguments, the Applicants will focus in particular on
15 independent claim 37, as amended, as the Applicants believe that claim to be
16 allowable over Ino ‘691. It is axiomatic that any dependent claim which depends
17 from an allowable base claim is also allowable, and therefore the Applicants do not
18 believe it is necessary to present arguments in favor of each and every dependent
19 claim.

20 21 Claim 37

22 The Applicants contend that claim 37, as amended (and rejected claims 38
23 and 40-41 which depend therefrom), are not anticipated by Ino ‘691. In regard to
24 claim 37 (as amended), that claim recites the following:

25
A method of fabricating a subterranean structure, comprising:
excavating soil to form a downward sloping ramp;

1 forming a concrete slab on the downward sloping ramp;
2 continuing to excavate soil to extend the downward sloping
3 ramp to a location under the concrete slab;
4 continuing to form the concrete slab on the downward sloping
5 ramp so that a subterranean structure is formed having an essentially
6 continuous concrete slab with a first portion which is above and
7 spaced-apart from a second portion; and
8 prior to the excavating, driving plural sheet piles to define an
9 inner perimeter and an outer perimeter for the continuous concrete
10 slab to thereby place the first and second portions in general vertical
11 alignment with one another.

12 (Emphasis added.)

13
14 Ino '691 fails to provide driving plural sheet piles to define an inner perimeter
15 and an outer perimeter for the continuous concrete slab to thereby place the first and
16 second portions in general vertical alignment with one another, as recited in
17 combination with the other features and limitations of claim 37, as amended. In fact,
18 Ino '691 fails to provide for plural sheet piles, in any way or for any purpose. In order
19 to understand the Applicants' assertions regarding claim 37, as amended, and the
20 deficiencies of Ino '691 with respect thereto, the following background information is
21 provided:

22 The Examiner has asserted that Ino '691 discloses "two underground walls
23 that function as sheet piling are forced under the ground (see Abstract)." (Page 3 of
24 Office Action.) Such version of the Abstract of Ino '691, to which the Applicants
25 believe the Examiner is referring, is accessible via the Internet at:

<http://v3.espacenet.com/textdoc?DB=PAJ&&IDX=JP3013691&f=0>.

1 Therein, the Abstract of Ino '691 is presented as reciting: "Continuous
2 underground walls 1 forced to each other under the ground are constructed"
3 Respectfully, the Applicants assert that the English language Abstract of Ino '691 as
4 cited immediately above is not a true and accurate translation of the Abstract, or any
5 other portion, of Ino '691. The Applicants have had the Ino '691 reference
6 professionally translated, in its entirety, from its original Japanese into the English
7 language. A complete copy of the translated version of Ino '691 ("Ino '691 Trans.")
8 is provided herewith as Appendix "A" of this Response. The Applicants believe that
9 Ino '691 Trans., as provided herewith, is a true and accurate English language
10 translation of all of the original content of the Ino '691 reference. In reference
11 thereto, page 553, paragraph 2, recites:

12
13 "(1) An underground tunnel construction method whose salient
14 feature is to construct multiple underground tunnels one above the
15 other that are congruent in plane, by constructing continuous
16 underground walls that are opposed to each other underground,
17 placing a concrete floor slab on the excavated floor surface so that the
18 concrete floor slab forms one piece with the continuous underground
19 walls, then excavating underneath the aforementioned concrete floor
20 slab using the aforementioned concrete floor slab as a ceiling, and
21 placing another concrete floor slab on this excavated floor surface so
22 that the concrete floor slab forms one piece with the continuous
23 underground walls." (Emphasis added.)

24
25 Thus, Ino '691 is directed to a method of underground tunnel construction
wherein continuous (opposing) underground walls are constructed. Ino '691 does
not provide, teach or suggest that *any entity* is (or should be) "forced" or driven

1 under the ground, as alleged by the Examiner. In fact, and as evidenced by Ino '691
2 Trans., the original Ino '691 document is completely devoid of the terms "force",
3 "forced", "driven", or "driving", or any of their respective equivalents, in any context.
4 Further, none of the figures of Ino '691 depict walls 1 as being "driven" or "forced"
5 into the ground.

6 Furthermore, Ino '691 provides no mention or suggestion regarding "plural
7 sheet piles", or "sheet pile", or any respective derivative thereof, in any context. In
8 fact, the text of Ino '691 describes (as discussed above) constructing "continuous
9 underground walls", which suggests something other 'plural sheet piles". Further,
10 the drawings of Ino '691 do not show any form of sheet piles, but instead suggest
11 thick, continuous walls (see walls 1, Fig. 1, of Ino '691), as of concrete, and not as of
12 sheet piles. Therefore, Ino '691 completely fails to provide driving plural sheet piles
13 to define an inner perimeter and an outer perimeter for the continuous concrete slab
14 to thereby place the first and second portions in general vertical alignment with one
15 another, as recited in combination with the other features and limitations of claim 37,
16 as amended.

17 Therefore, Ino '691 fails to provide at least two limitations as positively recited
18 by claim 37, as amended. Such deficiency on the part of Ino '691 renders the § 102
19 rejection of claim 37, as amended, unsupportable and as such, the rejection should
20 be withdrawn.

21 For at least these reasons, the Applicants assert that claim 37, as amended,
22 is allowable. As rejected claims 38 and 40-41, as respectively amended, depend
23 (directly or indirectly) from claim 37, as amended, it is axiomatic that they too are
24 allowable at least by virtue of their dependence from an allowable base claim, in
25 addition to their own respectively patentable features and limitations.

(Continued on next page.)

1 Rejection of Claims under 35 U.S.C. § 103

2 Claim 39 is rejected under 35 USC § 103(a) as being unpatentable over Ino
3 '691 as cited above and as applied to Claim 37 above, in further view of JP-
4 2001032277-A to Kawaguchi ("Kawaguchi"). Claim 42 is rejected under 35 USC §
5 103(a) as being unpatentable over Ino '691 as applied to Claim 41 above, in further
6 view of JP-03017311-A to Ino et al. ("Ino '311"). Claim 43 is rejected under 35 USC
7 § 103(a) as being unpatentable over Ino '691 in view of Ino '311 as applied to Claim
8 42 above, in further view of U.S. Patent No. 5,775,043 to Murio ("Murio").

9 Claims 54-59 and 65 are rejected under 35 USC § 103(a) as being
10 unpatentable over Ino '691. Claim 60 is rejected under 35 USC § 103(a) as being
11 unpatentable over Ino '691 as applied to Claim 57 above, in further view of Ino '311.
12 Claim 61 is rejected under 35 USC § 103(a) as being unpatentable over Ino '691 in
13 view of Ino '311, as applied to claim 60 above, in further view of Murio. Claim 64 is
14 rejected under 35 USC § 103(a) as being unpatentable over Ino '691 as applied to
15 claim 54 above, in further view of Kawaguchi.

16 It is axiomatic that any claim that depends (directly or indirectly) from an
17 allowable independent claim is itself also allowable. As argued above, the
18 Applicants assert that claim 37, as amended, is allowable. Because rejected claims
19 39, 42 and 43 depend from claim 37, as amended, the Applicants assert that they
20 too are allowable at least by virtue of their respective dependence from an allowable
21 base claim, as well as for their own respectively allowable features and limitations.

22 The Applicants respectfully disagree that claims 54-61 and 64-65 are
23 unpatentable as respectively rejected above.

24 As a starting point, MPEP 706.02(j) states:

25 "[t]o establish a *prima facie* case of obviousness, three basic
criteria must be met. First, there must be some suggestion or
motivation, either in the cited references themselves or in the

1 knowledge generally available to one of ordinary skill in the art, to
2 modify the reference or to combine the reference teachings. Second,
3 there must be a reasonable expectation of success. Finally, the prior
4 art reference (or references when combined) **must** teach or suggest
5 all the claim limitations. The teaching or suggestion to make the
6 claimed combination and the reasonable expectation of success must
7 both be found in the prior art and not based on applicant's disclosure."

8 (Emphasis added.)
9

10 Rejected claims 55-61 and 64-65 depend, directly or indirectly, from
11 impendent claim 54. Because it is axiomatic that any claim depending from an
12 allowable base claim is also allowable, the Applicants will provide arguments
13 hereinafter in support of independent claim 54. The Applicants do not believe it
14 necessary to provide arguments in favor of each and every dependent claim, in
15 order to establish their respective allowability.
16

17 Claim 54

18 The Applicants assert that claim 54 (and rejected claims 55-61 and 64-65
19 depending therefrom) are allowable. In regard to claim 54, that claim (as amended)
20 recites the following:
21

22 A method of fabricating a subterranean structure, comprising:
23 excavating soil to form a downward sloping ramp;
24 forming a concrete slab on the downward sloping ramp;
25 continuing to excavate soil to extend the downward sloping
ramp to a location under the concrete slab; and

1 continuing to form the concrete slab on the downward sloping
2 ramp so that a subterranean structure is formed having an essentially
3 continuous concrete slab with a first portion which is above and
4 spaced-apart from a second portion, wherein the second portion of the
5 concrete slab is generally in alignment with the first portion of the
6 concrete slab, and wherein the first and second portions are defined
7 by a continuous outer perimeter and a continuous inner perimeter,
8 and;

9 after at least some of the second portion of the concrete slab
10 has been formed, providing a wall element to join the first and second
11 portions of the concrete slab at one of the inner or outer perimeters.

12 (Emphasis added.)
13

14 Ino '691 fails to teach or suggest a method of fabricating a subterranean
15 structure, wherein after at least some of the second portion of the concrete slab has
16 been formed, providing a wall element to join the first and second portions of the
17 concrete slab at one of the inner or outer perimeters, as recited in combination with
18 the other features and limitations of claim 54.

19 To the contrary, Ino '691 provides only teachings in which two opposed,
20 generally parallel underground walls 1 are constructed first, prior to performing any
21 other construction or method steps. The Examiner is respectfully referred to page
22 number 554 of Ino '691 Trans., as provided in Appendix "A" of this Response.
23 Therein, the teachings of Ino '691 include:
24

25 Step <A>: "Construct continuous underground walls 1 opposed
to each other underground..."; and then

1 Step : "Excavating the ground between continuous
2 underground walls 1...The excavated surface goes down in a spiral."; and thereafter

3
4 Step <C>: "Place concrete floor slab 2 in a spiral on the
5 excavated floor surface 5, which was excavated in spiral as given
6 above..."; and so on.

7
8 Therefore, in the context of Ino '691, construction of underground walls 1
9 *precedes* any excavation of the spiral ground surface 5 and, in turn, the placing of
10 any concrete floor slab 2 thereon. Thus, Ino '691 provides only for methods of
11 construction in which the construction of underground walls 1 *precedes* any other
12 construction or method step, and certainly precedes the placement or formation of
13 any portion of the concrete floor slab 2. This is not the same as the invention as
14 recited by instant claim 54.

15 Further, Figs. 1, 3 and 4 of Ino '691 suggest that the walls 1 are placed prior
16 to any excavation (and slab placement), as the walls are depicted as extending
17 substantially below the area of current excavation (see esp. Fig. 1). In any event,
18 the figures of Ino '691 certainly do not teach or suggest placing the walls 1 *after*
19 placing a second flight of the concrete slab, as is required by Applicants' claim 54.

20 The Examiner has admitted that the teachings of Ino '691 fail to explicitly
21 disclose a method comprising a step wherein no wall element of the subterranean
22 structure is provided until at least some of the concrete slab has been formed (page
23 7 of Office Action). However, the Examiner asserts that Ino '691 does "not preclude"
24 such a step, and that the limitations of claim 54 include a negative limitation. *Id.*
25 While the Applicants disagree with this logic (a negative limitation recited within a
claim is still a limitation - see MPEP 2173.05(i)), claim 54 has been amended to
remove the negative limitation, and to further correct an antecedent basis problem

1 (for "wall element"). Accordingly, claim 54 now recites a positive limitation which is
2 not taught or suggested by Ino '691. Furthermore, the Applicants assert that one of
3 ordinary skill in the relevant art would not consider deviating from the specific
4 teachings of Ino '691, as there is no suggestion or expectation of success within Ino
5 '691 to do so. Rather, one of ordinary skill in the relevant art would closely adhere to
6 the teachings of Ino '691 and would construct continuous underground walls 1 first
7 (prior to constructing the concrete slab), in order to avoid risk of cave-in or other
8 similar detrimental occurrences during construction.

9 In any event, Ino '691 fails to teach or suggest at least one limitation as
10 recited by claim 54. Such deficiency on the part of Ino '691 renders the § 103(a)
11 rejection of claim 54 unsupportable in view of the requirements of MPEP 706.02(j).
12 As such, the § 103 rejection of claim 54 should be withdrawn.

13 For at least these reasons, the Applicants assert that claim 54 is allowable.
14 As rejected claims 56-61 and 64-65 depend from claim 54, it is axiomatic that they
15 too are allowable.

16 17 Claim Rejections under Non-Statutory Double Patenting

18 Claims 37-65 have been rejected under the judicially created doctrine of
19 obviousness-type double patenting, as being unpatentable over claims 1-10 of U.S.
20 Patent No. 6,616,380.

21 A terminal disclaimer in accordance with 37 C.F.R. §1.321(c) is submitted
22 contemporaneous with this Response in order to overcome the double patenting
23 rejection of claims 37-54 and 56-65 (as respectively amended). Thus, the
24 obviousness-type double patenting rejection of claims 37-54 and 56-65, as
25 respectively amended, is believed moot.

(Continued on next page.)

1 Request for Extension of Time under 37 CFR 1.136(a)

2 Applicants hereby request a one (1) month extension of time under 37 CFR
3 § 1.136(a) to extend the period for response to and through April 4, 2005. Although
4 a one month extension extends the date for filing until April 2, 2005, since that date
5 is a Saturday, under 37 CFR § 1.7 the date for responding is extended to Monday,
6 April 4, 2005. The required fee is enclosed herewith.

7
8 Summary

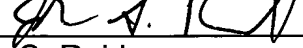
9 The Applicants believe that this response constitutes a full and complete
10 response to the Final Office Action dated December 2, 2004, as well as a complete
11 submission to accompany Request for Continued Examination in accordance with
12 37 CFR 1.114. Therefore, the Applicants respectfully request reconsideration of
13 claims 37-54 and 56-65, as respectively amended, in favor of timely allowance.

14 The Examiner is respectfully requested to contact the below-signed
15 representative if the Examiner believes this will facilitate prosecution toward
16 allowance of the claims.

17
18 Respectfully submitted,

19 Matthew F. RUSSELL; and
20 Robert L. RUSSELL

21 Date: March 23, 2005

22 By 
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19. Japan Patent Office (JP) 11. Patent Application Publication
12. Unexamined Patent Publication Bulletin(A) H3-13691

51. Int. Cl ⁵	Domestic Classification Symbol	JPO File No. 43. Publication: Jan. 22, H3 (1991)
E 21 D 9/04	Z	6541-2D
E 02 D 5/18	102	8202-2D

Examination Request Unexamined No. Items Requested: 1 (4 total)

54. Name of Invention	Underground Tunnel Construction Method		
	21. Patent Application	H1-144009	
	22. Submitted Application	June 8, H1 (1989)	
72. Inventor	Ino, Toshimi	Shinjuku 1-25-1, Shinjuku-ku, Tokyo	Inside Taisei Kensetsu Corp.
72. Inventor	Kaneko, Kenichi	Shinjuku 1-25-1, Shinjuku-ku, Tokyo	Inside Taisei Kensetsu Corp.
71. Applicant	Taisei Kensetsu Corp.	Shinjuku 1-25-1, Shinjuku-ku, Tokyo	
74. Agent	Attorney - Yamaguchi, Sakuo		

DESCRIPTION

1. Name of Invention
Underground Tunnel Construction Method

2. Scope of Patent Request

(1) An underground tunnel construction method whose salient feature is to construct multiple underground tunnels one above the other that are congruent in plane, by constructing continuous underground walls that are opposed to each other underground, placing a concrete floor slab on the excavated floor surface so that the concrete floor slab forms one piece with the continuous underground walls, then excavating underneath the aforementioned concrete floor slab using the aforementioned concrete floor slab as a ceiling, and placing another concrete floor slab on this excavated floor surface so that the concrete floor slab forms one piece with the continuous underground walls.

3. Detailed Description of the Invention
<Industry Field to Use the Invention>

This invention is a method for constructing multiple underground tunnels one above the other that are congruent in plane.

<Existing Technology>

The chronic traffic congestion on roads in urban areas makes it desirable to construct circular roads exclusively for automobiles.

However, due to the steep rise in land prices, little headway is being made with land problems, and ideas are emerging for constructing deep road tunnels.

Proposals which use spiral-shaped ramps as a way to access these deep road tunnels are more effective than those that use long inclined passages.

<Problems This Invention is Intended to Solve>

Traditionally, when constructing spiral-shaped ramps such as those mentioned above, a method is used in which a large-scale earth brace is constructed on the outer circumference, and the interior of that is excavated.

When the tunnels are not very deep, this method does not present a problem, but with deeper tunnels,

the following problems occur.

<A> Because a large-scale earth brace is necessary, excavation, the amount of earth to be buried, and the number of processes increase, making the existing method ineffective in terms of cost.

 It is difficult to secure enough land aboveground for the entire circle of the inside of the ramp.

<C> Ramps and temporary piers are necessary for excavation.

Also, the existing method is not cost-effective because there are many cases in which loading machines, etc. are necessary in addition to the excavating machines.

In addition, formwork support systems are costly.

<Purpose of This Invention>

This invention is intended to solve the abovementioned problems, and its purpose is to provide a method for constructing underground tunnels in which underground tunnels do not need large-scale earth braces, can be constructed cost-effectively, and the construction period is shortened.

<Configuration of This Invention>

One embodiment of this invention is described below, using the drawings as a reference.

<A> Constructing continuous underground walls

can be installed on Excavated Floor Surface 5, or the floor surface can be manually polished like a mirror surface, and a plastic sheet, etc. can be laid.

<D> Excavation (Vehicle exit lane)

When the strength of Concrete Floor Slab 2 has been assured, excavate underneath it using Concrete Floor Slab 2 as a ceiling.

Then, construct Concrete Floor Slab 2 on Excavated Floor Surface 5, using the same method as that mentioned above.

Use this new space that was created as Vehicle Exit Lane 6.

Repeat the work in <A> through <D> above, construct a spiral Underground Rampway 8 as shown in Drawing 3, and connect it to deep Road Tunnel 81.

Then, complete construction of the inside by implementing pavement or Interior 7, etc., as shown in Drawing 4, so that it can be used as a road tunnel.

In addition, the abovementioned embodiment states an example in which a spiral underground tunnel is constructed, but if this invention is being used to construct multiple underground tunnels one above the other that are congruent in plane, a straight underground tunnel can be constructed.

Construct Continuous Underground Walls 1 opposed to each other underground.

For example, as shown in Drawing 2, construct two concentric Continuous Underground Walls 1.

Because Continuous Underground Walls 1 are used as a structure, Continuous Underground Walls 1 are constructed so that they can be joined as one piece with Concrete Floor Slab 2, by mounting Reinforced Steel 3, which has joints such as screws attached to it, to the location where Continuous Underground Walls 1 connect with Concrete Floor Slab 2.

 Excavation (Vehicle entry lane)

Excavate the ground between Continuous Underground Walls 1 using an excavation machine, etc. as shown in Drawing 2.

The excavated surface goes down in a spiral shape.

Here, because two tunnels for a vehicle entry lane and a vehicle exit lane are necessary, this will be called Vehicle Entry Lane 4.

<C> Placing the concrete floor slab

Place Concrete Floor Slab 2 in a spiral on Excavated Floor Surface 5, which was excavated in a spiral as given above, using Reinforced Steel 3 to fix Concrete Floor Slab 2 to both Continuous Underground Walls 1.

Before placing Concrete Floor Slab 2, formwork

<Benefits of the Invention>

Because this invention is configured as described above, the following benefits can be expected.

<A> With this invention, it is sufficient to excavate the minimum of ground for constructing underground tunnels.

Therefore, it is possible to shorten the construction period and reduce costs, because the traditional large-scale earth braces and excavation are not necessary.

 As a result of the continuous construction of the undersides of the floor slabs, underground tunnels can be constructed with continuous ceiling slabs and no supports.

For that reason, this method is cost-effective because formwork and supports are not necessary for the ceiling slabs.

<C> This method is cost-effective because existing ceiling slabs can be used as temporary construction roads for transporting soil, etc., rendering temporary equipment such as piers and ramps unnecessary.

<D> This method is cost-effective because burying soil is not one of the work processes, so only excavation is needed.

<E> This method is efficient because there is no need to combine excavating machines and loading machines (for example, clamshells and backhoes).
 <F> Because there can be more than two work locations, the work is continuous.

4. Brief Description of the Drawings

Drawing 1: Drawing describing one embodiment of this invention

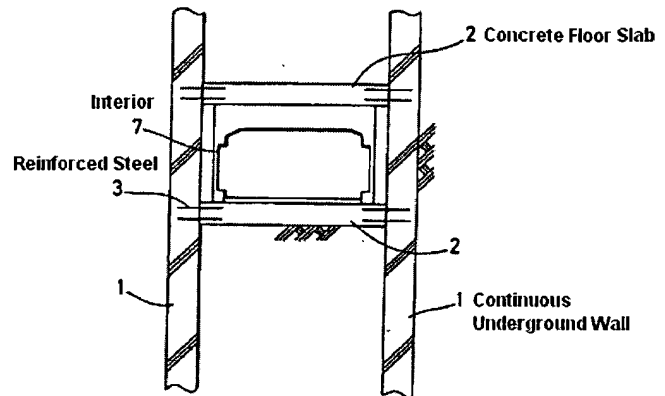
Drawing 2: Top view of the rampway

Drawing 3: Drawing showing a side view of the rampway

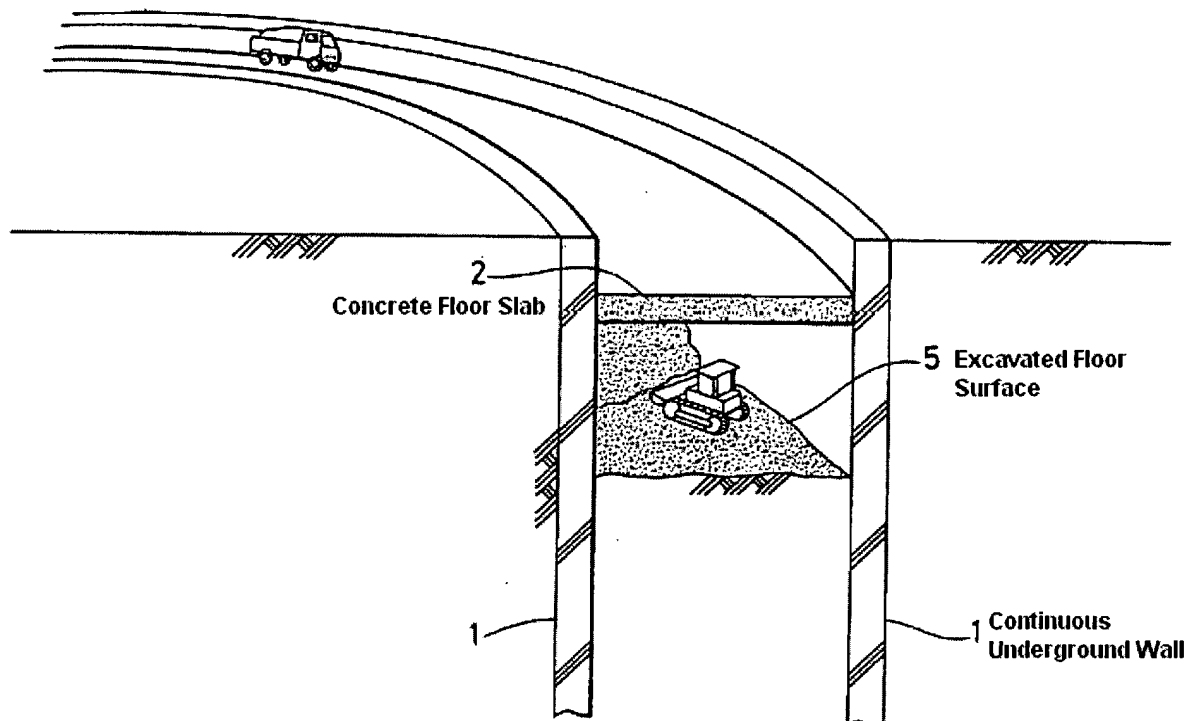
Drawing 4: Drawing with the interior constructed

Applicant Taisei Kensetsu Corp.
 Agent Attorney - Yamaguchi, Sakuo
[Illegible Stamp]

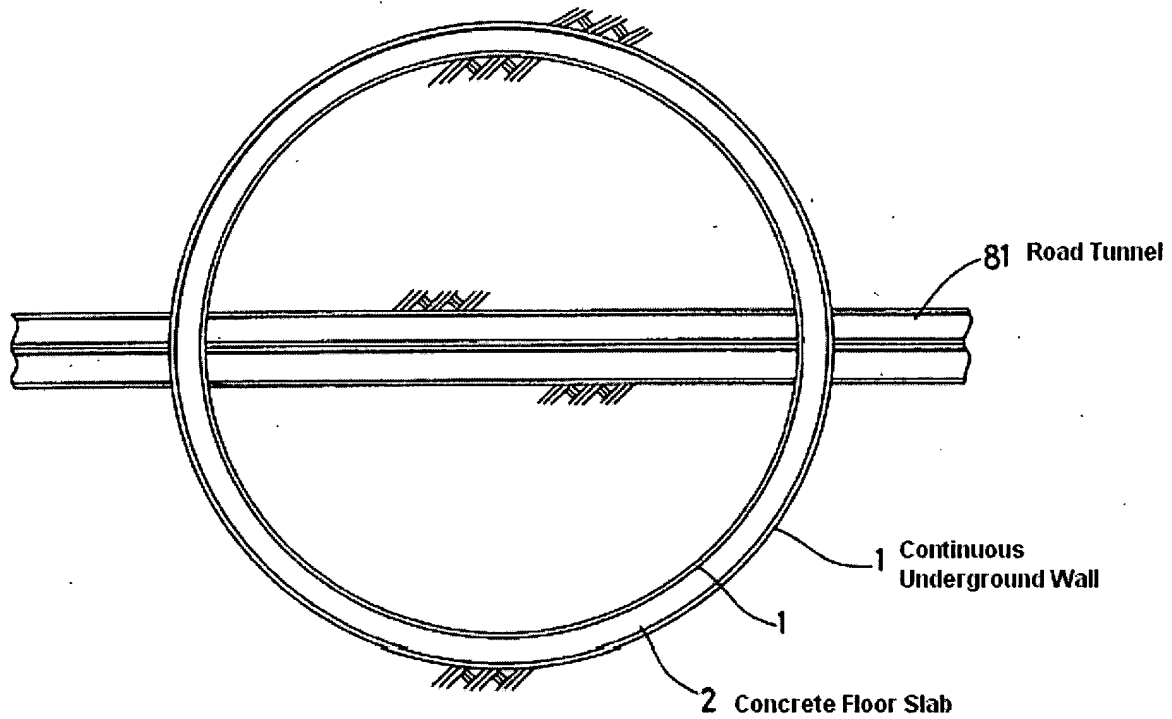
Drawing 4



Drawing 1



Drawing 2



Drawing 3

